THE PHYTOLOGIST.

No. XIV. | JULY, MDCCCXLII. | PRICE 1s.

ART. LXXI.—*Analytical Notice of the 'Transactions of the Linnean Society of London,' vol.* xviii. *pt.* 4. *August,* 1841.

(Concluded from p. 72).

ART. XXXIII.—*A Monograph of the Genus* Disporum. By DAVID DON, Esq., Libr. L.S., Prof. Bot. King's Coll. Lond.

THE name of this genus, unaccompanied by a description, first appeared in Mr. Salisbury's list of Petaloid Monocotyledons, published in the first volume of the Horticultural Society's Transactions. The chief characters of the genus were pointed out by Mr. Brown, "and among others its binary ovula, which doubtless suggested to Salisbury the name of *Disporum*." No description of the genus appeared until the publication of Mr. Don's 'Prodromus Floræ Nepalensis,' in 1824, where, to Salisbury's single species—Disp. pullum (misprinted *fulvum* in the Prodromus, as well as in the report of the present paper in the 'Proceedings of the Linnean Society,' p. 45), two others are added, namely, Disp. Pitsutum * and Disp. parviflorum.†

> "The characters of the genus consist in its campanulate perianthium, with the sepals produced into a short pouch or spur at the base, in the cells of its ovarium bearing two [ascending] ovula, in its baccate pericarpium, and in its umbellate inflorescence. These distinctions will be found to be common to all the Asiatic species hitherto improperly referred by most botanists to Uvularia. * * This genus terminates the series of the Melanthaceæ, forming the transition from that family to the Smilaceæ, the chain of connexion between them being rendered complete by the intervention of a new genus, of which Streptopus lanuginosus is the type."—p. 513.

The normal Melanthaceæ, principally North American plants, have the floral organs "persistent, and the partial decomposition of the trimerous pericarpium is almost universal." From the author's remarks on the three groups into which "the Melanthacea appear naturally to divide themselves," we extract the following characters.

---

* The Uvularia Pitsutu of Buchanan Hamilton, MSS.; Uv. umbellata, Wallich, 'Asiatic Researches,' xiii. 379, Wal. Catalogue,' No. 5090; Streptopus peduncularis, Smith, Rees' 'Cyclopœdia,' under Uvularia.

† Uvularia parviflora, Wallich, 'Asiatic Researches,' xiii. 379.

1. *Melantheæ* or *Veratreæ*. Carpels partially concrete; pericarp capsular; dehiscence generally septicidal; flowers frequently unisexual; perianth less coloured, persistent; stamens persistent; rhizoma fibrous. British genus, *Tofieldia*.
2. *Colchiceæ*. Perianth more highly developed; sepals with long claws, often combined into a tube; styles long; carpels concrete; pericarp capsular, dehiscence septicidal; rhizoma bulbous; floral axis naked, hypogæous. British genus, *Colchicum*.
3. *Anguillarieæ*. Floral organs frequently deciduous; styles short, as in the first group; carpels completely concrete; pericarp capsular or baccate, dehiscence loculicidal; rhizoma bulbous or fibrous; axis leafy.

> "The genus Colchicum establishes an evident relationship through Sternbergia and Crocus between Melanthaceæ, Amaryllideæ, and Irideæ. The present genus connects the family with Smilaceæ, and Tofieldia as clearly with Junceæ, whilst a comparison of the structure of Uvularia and Erythronium fully makes out their affinity with Liliaceæ or Tulipaceæ. * * The class of Monocotyledonous plants offers a beautiful confirmation of the truth of the doctrine of the continuity of the series of organized beings; and however much the universal existence of transition or osculant genera in this class may perplex the botanist who looks to the technical definition of his groups as the highest object of the science, we are not to exclude such genera from our researches merely because their presence renders the circumscription of our pretended natural orders more difficult, for they certainly form the most interesting part of the study of natural affinities."—p. 514.

Eight species, natives of Asia, are fully described in this Monograph; and the paper is concluded by a description of Reichenbach's closely allied genus Kreysigia. The species—Kreys. multiflora, is a native of New Holland, and was discovered by Mr. Allan Cunningham, who introduced it in 1823 to the Royal Botanic Garden, Kew, where it annually flowers and matures its fruit. It was at first supposed to be a species of Schelhammera, but on examination was found to differ essentially both from that genus and Disporum.

> "This genus is essentially distinguished from Schelhammera by its sessile biappendiculate sepals; by the stamens proceeding free from the torus, unconnected with the sepals; by the cells of its ovarium bearing only two ovula; by its somewhat baccate pericarpium; and, lastly, by its axillary peduncles, which are furnished with three small verticillate bractes. The presence of appendages, the spreading sepals, free stamens, strophiolate seeds, minute embryo, axillary inflorescence, and valvular fruit remove it equally from Disporum."—p. 523.

The attention of the author was drawn to the appendages at the base of the sepals, resembling those of Parnassia, by Mr. John Smith of Kew; Mr. Don, as well as Endlicher, at first supposed them to be imperfectly developed stamens, but Mr. Brown having pointed out "the intimate connexion of these curious appendages with the sepals, and the entire absence from them of vascularity," the author here corrects the error into which he had previously fallen.

Art. XXXIV.—*A Monograph of* Streptopus, *with the Description of a new Genus now first separated from it.* By David Don, Esq., Libr. L.S., Prof. Bot. King's Coll. Lond.

"The genus Streptopus was first proposed by the elder Richard in Michaux's 'Flora Boreali-Americana,' and was intended to include not only the Uvularia amplexifolia of Linnæus, but two other plants therein described for the first time, namely, S. roseus and lanuginosus. The two last are exclusively confined to North America, while the first is common to Europe and America."—p. 525.

In Streptopus amplexifolius, which Mr. Don considers as the type of the genus, are united the following characters:—a six-leaved campanulate perianth with deciduous sepals, which have "a nectariferous furrow at their base; erect sagittate anthers, with short dilated filaments; three separate stigmata;" and a berry-like pericarp with polyspermous cells. From the genus thus characterized the author has found it necessary to remove Strept. lanuginosus, on which he founds a new genus. The genus Streptopus still comprises three species,—Str. amplexifolius, roseus, and simplex: the last species is from the Himalayas, and was first described by the author in his 'Prodromus Floræ Nepalensis.'

"These plants have all a peculiar habit, cylindrical leafy stems, broad amplexicaul leaves, glaucous beneath, and axillary, solitary, mostly single-flowered peduncles, which in amplexifolius are curiously twisted at their middle. The genus undoubtedly belongs to the Smilaceæ, and is nearly allied to Convallaria and Smilacina, but is essentially distinguished from both by its distinct sepals, each furnished with a nectariferous furrow, separate stigmas, and polyspermous berry. With Uvularia it accords in habit, and in its solitary, axillary, campanulate flowers; but its innate anthers, furnished with short filaments, baccate pericarpium, and noncarunculate seeds, remove it widely from that genus."—p. 526.

Of the new genus, Prosartes, the author observes: —

"This very natural genus, as I have already stated, forms the transition from the Smilaceæ to the Melanthaceæ, and possesses several characters in common with Streptopus and Disporum. From the former genus it is essentially distinguished by its much more lengthened filaments, binary pendulous ovula, and terminal umbellate inflorescence; [and it differs from Disporum] in its innate anthers, nearly concrete styles, and pendulous seeds."—p. 531.

The genus Prosartes includes two species,—Pros. lanuginosa, from North America, the Streptopus lanuginosus of Michaux; and Pros. Menziesii, also from North America, named after the late Mr. Menzies, and now first described.

"In the Smithian Herbarium there is a single specimen of this highly interesting plant gathered by my venerable friend Mr. Menzies on the north-west coast of America in the voyage of discovery under Vancouver, to which he was attached in the capacity of naturalist. It bears a close resemblance to some species of Disporum; and it moreover agrees with that genus in its sepals being produced into a pouch at their base. The flowers, which are also terminal and in pairs, are twice the size of those of the preceding, and the style is copiously hairy."—p. 534.

From their position in the natural system, and the author's remarks on their affinities, it will be evident that the plants described in the papers above noticed bear a close relationship to many interesting British genera, including Trichonema, Convallaria, Ruscus, Paris, Tofieldia, Narthecium, &c.

Art. XXXV.—*On some new Brazilian Plants allied to the Natural Order* Burmanniaceæ. By John Miers, Esq., F.L.S.

Von Martius, in his 'Nova Genera et Species Plantarum Brasiliensium,' gives the characters of the genus Burmannia, and fully describes five species, discovered by him in the interior provinces of Brazil. Michaux gave the generic name of Tripterella to two North American species, which Mr. Miers appears to consider as not distinct from Burmannia. Seven other species have also been found in Africa, India, and New Holland. Previously to his departure from Brazil the author discovered five new plants, closely allied to Burmannia, but differing from that genus in many important particulars. These five species, together with another discovered by Mr. Schomburgk in British Guinea, and Nuttall's Apteria setacea, are divided into three genera, namely, Dictyostega, containing four species, Cymbocarpa with one, and Apteria, *Nuttall*, (formerly Stemoptera, *Miers*) with two species. All these genera and species are fully described in the present paper, and their characters minutely illustrated by figures.

The author observes that the Burmanniaceæ may be divided into two groups. The first will contain the genera Burmannia and Gonyanthes, having a trilocular ovarium and central placentation; the second, possessing a unilocular ovarium and parietal placentation, will include Dictyostega, Cymbocarpa, Apteria and Gymnosiphon. If the principle be adopted "on which Apostasieæ have been separated from Orchideæ and Xyrideæ from Restiaceæ," the two sections must be kept distinct, and the author suggests that the second would, in that case, form a separate family, under the name of Apteriaceæ; if however the difference in the structure of their ovaria be not thought sufficient to warrant their separation, they must remain associated as Burmanniaceæ, the first section being named Burmannieæ, the second Apterieæ. The author mentions Gentianeæ as an order presenting many similar instances of transition from a unilocular capsule and parietal placentation to a bilocular fruit and central placentation.

The author next details some very striking points of resemblance between these plants and many Orchideæ; particularly in their seeds and the structure and texture of the pericarp, as well as in their stem and imperfectly developed leaves: and he observes that but for the differences in the stamens and stigmata, "it would be difficult to draw a line of distinction between the structure of these plants and that of Orchideæ."

"Another analogous fact is deserving of notice: on examining the stigma of Dictyostega after flowering, it will be found to be crowded with bundles of white cottony filaments, which may be seen even with a common lens to consist of pollen-tubes issuing in a body from the cells of the anthers and penetrating the stigma, leaving their ends exserted, and clavately terminated by their respective grains, thus displaying in a very beautiful manner the singular mode of fecundation so ably illustrated by Mr. Brown in his admirable paper on that subject, published in the 16th volume of the Transactions of this Society. The pollen also in its texture presents great resemblance to that of the Orchideæ, its component granules cohering in like manner into a solid waxy mass previous to the dehiscence of the anthers."—p. 551.

Art. XXXVI. — *Some Account of the* Curata, *a Grass of the Tribe of* Bambuseæ, *of the Culm of which the Indians of Guiana prepare their Sarbacans or Blow-pipes.* By Robert H. Schomburgk, Esq. *Communicated by the Secretary.*

During his first expedition in Guiana M. Schomburgk discovered the plant from which the Indians prepare their deadly arrow-poison, (Phytol. 47). This discovery rendered our enterprizing traveller the more anxious to identify the plant from which are obtained the reeds used in the manufacture of the Indian blowpipes. Nearly forty years had elapsed since Baron Humboldt saw a canoe nearly filled with them, and was led to ask the question—"What is the Monocotyledonous plant that furnishes these admirable reeds?" and during that period botanists had received no further information relative to the plant or its place of growth.

"No wonder, therefore," says M. Schomburgk, "that next to the plant which furnishes the active principle of the famous Urari or Wurali poison, the discovery of the reed by means of which the Indian is enabled to send his poisoned arrow with so much precision into his intended victim, should have been a point of the greatest interest to me.

"But in answer to all my questions to the Indians as to the locality from whence they procured the reeds that play such an important part in the construction of the blowpipe, they merely pointed to the west, and gave me to understand that it was far away. The value which the Indians of Guiana set upon these reeds, and the uncertainty from whence they came, increased their interest; and one of my first questions on arriving at a settlement of Indians which I had not previously visited, was, whether they knew from whence were obtained these reeds, so different in structure from all known Bambuseæ. I ascertained at last that the Macusis received them from the Arecunas, but that they did not grow in the country of that tribe; on the contrary, the Arecunas undertook journeys of several months duration to procure them from another tribe, who lived still further westward."—p. 557.

M. Schomburgk, in his third expedition, visited the Arecunas, and from them he ascertained "that the plant which produced the reeds grew in the country of the Guinau and Maiongcong Indians, near the head-waters of the Oronoco."

"We saw among the Arecunas a large number of these reeds, which they were manufacturing into blowpipes. The reed being so valuable, and so liable to destruction if carried openly through the woods, the Indian puts it for protection into the slender trunk of a palm (a species of Kunthia?), which he simply hollows out for the purpose. Being aware that the tube thus manufactured is in constant demand by the other tribes, he does not leave the regions which he inhabits to offer his ware for sale, but patiently awaits the visits of the Macusi, skilled in manufacturing the Urari poison, who brings him that deadly preparation, and exchanges it against these reeds or the ready-finished blowpipe. By this mutual exchange, they are each rendered masters of life and death over the feathered game; for, armed with his blowpipe, the wily huntsman gradually steals nearer and nearer to his victim, and launches his weapon of death, which seldom fails of its deadly aim, before the unconscious bird is even aware of the approaching danger.

"The great object of my last expedition led me to that far west. We camped on the 26th of January near the river Emakuni, at a settlement inhabited by Maiongcong Indians; and the first object which struck me on entering the miserable hut which served as a dwelling to the Indians, was a large bundle of these reeds, some of which were sixteen feet long; a circumstance which naturally induced the inquiry, from whence they came. The houses being built on elevated ground, we had an extensive view before us: at the distance of twenty miles we observed a large chain of mountains, which trended N.N.E. and S.S.W.; and among this chain a high mountain was pointed out to us, which they called Mashiatti, and where we were told that these reeds were growing; but as we were given to understand that we should find them likewise at Marawacca, and as Mashiatta was entirely out of our road, we did not visit it. It was consequently only in the middle of February, and after we had crossed the river Parima, that my wish of becoming acquainted with that curious plant was accomplished.

"The Maiongcong and Guinau Indians, whom the Spaniards call Maquiritares, conducted us to that part of Marawacca (a high mountain which terminates in an almost perpendicular wall of sandstone) where the plant grows. It is a day's journey from a Maiongcong settlement on the river Cuyaca, from whence the hospitable and good-natured savages showed us the beaten track. After having ascended Mount Marawacca, to about 3500 feet above the Indian village, the traveller follows a small mountain-stream, on the banks of which the *Curas* or *Curatas*, as the Indians call these reeds, grow in dense tufts. They form generally clusters of from fifty to one hundred, which are pushed forth, as in many other species of that tribe, by a strong, jointed, subterranean rootstock. The stem rises straight from the rhizoma, without a

> knot, and of equal thickness, frequently to a height of sixteen feet, where the first dissepiment stretches across the inside, and the first branchlets are formed. The articulations then continue at regular intervals of about fifteen or eighteen inches to a further height of from forty to fifty feet. The full-grown stem is at the base an inch and a half in diameter, or nearly five inches in circumference. It is of a bright green, perfectly smooth, and hollow inside."—p. 557.

The long jointless stem Mr. Schomburgk considers to be the growth of a very short period; it is surmounted by a head of numerous verticillate, slender, leafy, jointed branches, three or four feet long, which spring from the nodes of the articulated portion of the stem; the whole being terminated by the inflorescence.

> " The whole stem is from fifty to sixty feet high; but the weight of the numerous branchlets forces the slender stem to droop, and the upper part describes an arch, which adds greatly to its graceful appearance."—p. 560.

The Curata (its native name) grows in a rich soil and shady situation, about 6000 feet above the level of the sea. It appears to be restricted in its range to the chain of sandstone mountains extending between the second and fourth parallel, and forming the separation of waters between the rivers Parima, Merewari, Ventuari, Orinoco and Negro: M. Schomburgk determined only three localities, — Mounts Mashiatti, Marawacca and Wanaya.

> " It is a remarkable circumstance, that the plant which furnishes the chief ingredient for the preparation of the Urari poison is likewise peculiar to a few mountainous tracts; consequently the tribes who inhabit the regions where these plants grow, and who are acquainted with the mode of their preparation, acquire a general importance."—p. 560.

The Indians who inhabit the district where these reeds grow, are called Curata-people by the other tribes, a circumstance indicative of the rarity of the plant. The Indians of the Rio Negro and the Amazon, who have no intercourse with the Curata-people, manufacture their blow-pipes out of a slender palm, the stem of which is hollowed out, either by being steeped in water for some days, when the internal substance is pushed out with a stick, or else the stem is split along its length, and the interior is removed by burning; when the inside has been polished, the two parts are accurately joined together by an indigenous glue, and a wooden mouth-piece is added.

The constant demand for a plant having so limited a range, would be likely soon to exhaust the stock, were it not for the numerous shoots from a single rootstock and their rapid growth, combined with the great care taken of his blowpipe by the Indian. Carrying it erect he winds his way through thickets which would be almost impenetrable to the unincumbered European, without injuring his weapon. It is said by Humboldt that "a hunter preserves the same sarbacan during his whole life," and boasts of its precision and lightness as we do of the good qualities of our fire-arms.

The young reeds only are used in the manufacture of the blowpipe; these are cut into the proper lengths, turned slowly over a moderate coal fire to prevent their warping, exposed to the sun until they have acquired a deep yellow colour, and are then encased for protection in the trunk of a slender palm. "This case is called by the Macusi Indians Yúrúa-Cura-pong."

Mr. J. J. Bennett has determined this reed to be a distinct species of Arundinaria, near to the Arund. verticillata of Nees von Esenbeck and Kunth; he has named it *Schomburgkii*, and gives the following characters.

Arundinaria Schomburgkii. Leaves linear, acuminate, smooth; mouth of the sheaths bristly on each side: spike simple, few-flowered; spikelets sessile; hypogynous scales lanceolate, acute.

ART. XXXVII. — *On* Cuscuta epilinum *and* halophyta. By CHARLES C. BABINGTON, Esq., M.A., F.L.S., F.G.S., &c.

IN a paper 'On the Structure of Cuscuta europæa,' (Linn. Trans. xviii. 213), Mr. Babington confirms the accuracy of Mr. Brown's observations, on the existence of scales in the tube of the corolla of that species, in opposition to Sir J. E. Smith's opinion, that its flowers are, "in all the British specimens, as well as in Ehrhart's German ones, destitute of scales in the throat of the tube," ('English Flora,' ii. 25). Mr. Babington, on examining fresh specimens of Cuscuta europæa from Sompting, in Sussex, gathered in company with Mr. Borrer, found the scales lying quite close to the corolla, being perfectly transparent and very minute; and these circumstances would seem to account for their having been overlooked by Smith and Hooker, as well as by some of the continental botanists. Mr. Babington remarks:—

> "They are, indeed, so difficult of detection as not to have been at first noticed by Mr. Borrer and myself, even when examining fresh specimens, and it is scarcely possible to discover them in flowers that have been dried."—p. 213.

Reichenbach, in his 'Icones Plantarum,' pl. v. fig. 690, represents "each scale exactly under its corresponding stamen,* yet at p. 62 of the same volume he calls the corolla a calyx, and appears to have looked upon the scales as constituting the true corolla, and as alternating with the stamens:—

---

* See our fig. 2, which, with the other figures are copied from the Linn. Trans.

"This view is manifestly incorrect, for the scales constitute a complete internal whorl, each of them being connected with its neighbour so as to form a short tube, the upper edge of which is always free and distinct from the corolla (calyx of Reich.), and the lower parts of the filaments of the stamens may be traced under the cuticle of the corolla, descending exactly behind the centre of each scale. It is perfectly clear, therefore, that the scales cannot represent petals, since the whorl of stamens is invariably found within that of petals, but in this plant the stamens are situated further from the axis of the flower than the so-called corolla.

"I do not attempt to form any theory concerning these minute organs, but hope that some fortunate botanist will soon discover them in such a state of monstrous development as to show what is their real nature.

"That the number of scales is equal to that of the segments of the corolla is proved by their structure in C. epithymum, in which plant they are not even divided into two lobes, [fig. 3]. There is not, indeed, the slightest trace of a division to be discovered with a very high power of the microscope. I ought to add, that Reichenbach does not continue the above theory in his 'Flora Excursoria;' but reverts to the old nomenclature."—214.

Referring to Reichenbach's figure of the opened flower of Cuscuta europæa (Ic. Pl. v. f. 690, B., our fig. 2) Mr. Babington makes the following observations, which we particularly recommend to the notice of our readers.

"It will be seen that this last differs materially from my fig. 1. May not his plant be a distinct species characterized by its constantly 4-cleft corolla and palmate sexfid scales? This genus is well deserving of attention from British botanists, for several other species are known in Germany, Sweden, and France, which most probably exist in these islands."—p. 215.

Since the publication of the paper from which the above extracts are made, Mr. Babington has examined Cuscuta epilinum and halophyta, and in both these species he has detected the presence of scales. His observations are contained in the paper the title of which is given above.

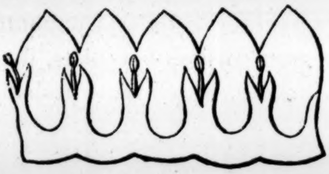
"In the first of these plants, Cuscuta epilinum, *Weihe*, we find a ventricose tube furnished with a whorl of adpressed bifid scales, each branch of which is usually divided in a rather irregular manner into two or three fingerlike points, as I have endeavoured roughly to represent in fig. 1, [our fig. 4]; the divisions of the corolla terminate in acute points, and the stamens have very short filaments and are inserted much higher up than the extremity of the scales.

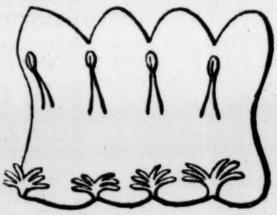
"In Reichenbach's figure of this plant in his 'Icones Plant.' tab. 693, the scales are very incorrectly given, each of them being there represented as two minute, separate, roundish bodies, pointing downwards. Specimens received from him (No. 19 of his Fl. Germ. exsic.), gathered near Borna, in the neighbourhood of Chemnitz, by M.

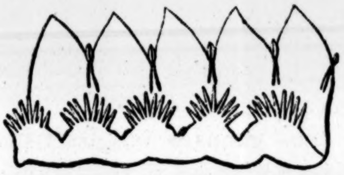
> Weicker, have however these parts of exactly the form described above, and agree in all points with the English plant, with the exception of the want of a bractea under each bunch of flowers. It is however possible, from the manner in which this bractea is hidden by the flowers in the English plant, that it may also exist in that found in Germany, although the employment of its absence as a part of the specific character, is strongly opposed to this supposition."—p. 563.

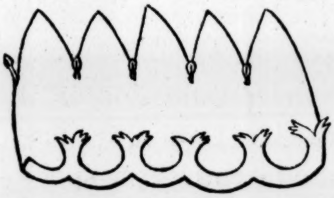
The next species, Cuscuta halophyta, has not, we believe, been detected in this country. It was recently discovered on the southern coast of Norway, growing on succulent saline plants; and was first described by Fries, in his 'Novitiarum Fl. Suec. Mantissa prima,' p. 8. Fries does not mention the scales; but Mr. Babington has found them in a specimen gathered by Dr. Blytt "on the coast of the Fiörd, near Christiana," who gave it to Mr. Bowman, from whom Mr. Babington received it.

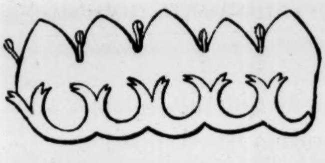
The following illustrations exhibit the corolla of each species laid open, in order to show the form of the scales, and their position with respect to the stamina; they are copied from Mr. Babington's figures in the two papers under notice: from which source are also derived the characters of the four species, and the description of Cuscuta epilinum.

1


2


3


4


5


1. *Cuscuta europæa*, Linn. (Sp. Pl. 180). "Clusters of flowers bracteated," sessile: scales bifid, erect, adpressed to the tube of the corolla; tube cylindrical when in flower, ventricose in fruit: calyx much shorter than the corolla. (Fig. 1).

Reichenbach's figure of the opened corolla is shown at fig. 2.

2. *Cuscuta epithymum*, Sm. (Eng. Bot. p. 378). "Clusters of flowers bracteated," sessile; scales palmately cut, connivent; tube of the corolla cylindrical, limb campanulate: calyx much shorter than the corolla. (Fig. 3.)

3. *Cuscuta epilinum*, Weihe, (in Boenningh. Prod. Fl. Monast. 75). Clusters of flowers bracteated, sessile; scales palmately somewhat six-cleft, adpressed to the tube of the corolla; tube always ventricose; segments of the calyx fleshy, deltoid at the base, scarcely shorter than the corolla. *Segments of the corolla acute.* (Fig. 4).

"Segments of the calyx 5, ovate, attenuated above into an acute point, very fleshy, with peculiarly large cells; some of them often so much thickened as to become deltoid. Tube of the corolla 1½ times as long as the limb, slightly inflated, the lobes triangular, acute; stamens inserted very near to the summit of the tube; filaments short; anthers cordate; the limb of the corolla is often very fleshy. Scales bifid, each lobe either entire or 2- or 3-fid, short. Styles 2, short, bent round each other. Bractes not always present, broadly ovate, obtuse, with a minute point, often purplish. Flowers whitish yellow, sometimes tinged with pink. Anthers bright yellow."—p. 565.

Found on flax in many parts of Britain, but most probably not indigenous. Mr. Babington observes that flax raised from American, and, he believes, Riga seed, are free from this parasite; but that it is "introduced with flax-seed from Odessa, and other ports of Southern Russia."

4. *Cuscuta halophyta*, Fries, (Nov. Fl. Suec. Mantis. p. 8). "Clusters of flowers somewhat bracteated," sessile; scales bifid, the segments also bifid, adpressed to the ventricose tube of the corolla: calyx much shorter than the tube of the corolla.—*Segments of the corolla ovate, obtuse. Segments of the calyx obtuse. Styles* 2. "*I have seen most of the clusters of flowers bracteated*," Fries. (Fig. 5).

A Norwegian species, not yet detected in Britain.

ART. XXXVIII.—*On the Reproductive Organs of* Equisetum. *By* Mr. JOSEPH HENDERSON. *Communicated by the* Rev. M. J. BERKELEY, M.A. F.L.S.

THE results of Mr. Henderson's observations on the reproductive organs of this genus, differ, in some respects, from those arrived at by Treviranus, Meyen, Bischoff and Mohl, by whom, without his being aware of the fact at the time he wrote, he has been in part anticipated. Mr. Henderson well remarks that:—

"There is no part of the structure of Equisetum more curious or more anomalous than the organs of reproduction; and although the position of the order in the natural system depends on the nature of these organs, yet this is so far matter of doubt, that very eminent botanists do not seem decided as to whether Equisetaceæ are to rank among Phænogamic or Cryptogamic plants."—p. 567.

Without however entering into this question here, we must content ourselves with giving, by way of introduction, a brief description of the fructification of the genus, which will render the subsequent analysis more clear and satisfactory.

The reproductive organs of Equisetum are borne in terminal conelike catkins, which are composed of a number of angular peltate scales, spirally arranged round a central common stalk or axis, to which each is attached by a short pedicel. Seated round the margin of each of these scales, on its inner or under surface, are from four to eight oblong membranous cells or thecæ, opening inwardly and longitudinally, and discharging numerous somewhat globose sporules, to each of which are attached, at one point, four spiral filaments; the filaments are dilated at the extremity, and they are generally more or less studded with small granules. Hedwig and other observers have described these filaments as stamens, looking upon their dilated extremities as the anthers, and supposing the minute granules to be the pollen. The filaments are at first wound spirally round the sporules, but when discharged from the theca suddenly unroll themselves, and cause the sporules to leap about as if alive. The curious motions of the sporules are owing to the structure of the filaments, which are excellent hygrometers, being twisted like the awns of Avena fatua or animated oat, and many other grasses, and are influenced in the same way by the varying degrees of moisture in the atmosphere.

Mr. Henderson's observations were made on Equisetum hyemale; and he describes the changes which take place in the various parts of the fructification, from the first appearance of the catkin above the terminal sheath of the stem up to the discharge of the mature sporule from the theca.

> "When the spike or fructification of Equisetum hyemale begins to swell beyond the terminal sheath, the spores may be observed in a rudimentary state on carefully dissecting the theca, the interior of which is at this time divided into cells of extreme tenuity, in which the spores originate. These cells are filled with a viscid, greenish-coloured fluid, which, when mixed with a small portion of water and highly magnified, will be found to contain innumerable minute granules, possessing spontaneous motion, and moving apparently on their axes with considerable rapidity: they are of various sizes and of various shapes, the larger generally oblong, the lesser spherical: they are all equally active, and being transparent, they communicate a whitish colour to the water when viewed with the naked eye. * * It is extremely difficult at this time to detach any of these cells entire, owing to the filmy condition of the walls and the viscid nature of their contained fluid: a better opportunity is afforded of viewing their form and arrangement, by macerating the theca in dilute nitric acid, when they appear somewhat shrunk and collapsed, and the minute granules are therefore easily discernible in the cells and also in the spores: the whole mass is easily forced asunder even to the theca, which separates into parts corresponding with the sides of the outer cells."—p. 568.

The next stage in the progress of the sporules, namely, their transition from the granules with which the cells are at first filled, to the aggregation of these granules in the centre of the cell, is partially supplied in a passage from Mohl, given as a foot-note at p. 567, from which we make the following extract.

> "The young capsules (of Equisetum variegatum) are filled with a very delicate, polyhedral, cellular tissue. These cells are connected together in greater or lesser masses, without, however, being surrounded by mother-cells (if they are not rather themselves to be so regarded), and are filled with a granular mass. In older capsules these cells are larger and distinct from each other, and the green granular contents form for the most part a disc lying in the middle of the cell. In still more advanced capsules this green disc is changed into an oval grain, wrapped round with the two elaters. * * —Flora, 1833, pp. 45, 46."

The spores are at first oval or ovate in shape, but they soon become globular, which form they afterwards retain: on the contrary the cells, which previously had an angular form from mutual pressure, "gradually acquire substance, separate from each other, and, changing their form, become first globular, and afterwards oval integuments of the spores; the spaces caused by their separation being filled up with a dark green viscid fluid containing abundance of minute granules."

> "The next change which the integument undergoes is in the development of the spiral sutures, by which it is divided into two narrow bands with broad and rounded ends: at first the dividing lines are indistinctly seen traversing the integument; after a time they become more distinct, and their spiral direction becomes evident. Two lines of separation run in a spiral direction round the integument, and meet in a sinuous transverse suture at each end: these lines cut the integument into two equal parts, the ends of which are dilated and uniform; and these are the clavate ends of the filaments which have been considered by Hedwig and others as forming part of a sexual apparatus. The separation of the integument into parts takes place immediately after the edges of the sutures have arrived at their proper thickness; it is therefore very difficult after this to find the integument entire.
>
> "The spore at this time contains a greenish-coloured fluid mixed with some minute granules; soon after it changes to a deeper green colour, its contents become thicker, less soluble in water, and filled with a greater number of granules; the fluid which had previously filled the integument and the rest of the theca is gradually absorbed, leaving the granules which it contained sticking in masses to the spores and to the separated portions of the integument. It is these masses of granules, when found adhering to the filaments in the ripened state of the spore, that have been mistaken for pollen-grains: when removed by means of water, they are found to consist exclusively of the lesser granules, the larger ones having now altogether disappeared. As the spore swells, the divisions of the integument are forced asunder; a portion at each end however generally adheres longer; and although further separated, these divisions are still held in their spiral position until the ripening of the spore, when, being ejected from the theca, they recoil with a jerk, and immediately twist into narrow clavate filaments, the state in which they have been most frequently observed."—p. 569.

When the spore is ripe it has a wrinkled appearance; on the addition of water its size is considerably enlarged and the wrinkles disappear. A curious effect is produced on tincture of iodine being added to the water; the nucleus of the spore "is contracted to a much smaller size, leaving the outer membrane occupying the space to which it had been distended by the water, and appearing under transmitted light like a transparent limb to the opake spore." The minute granules in the spore are said to be "exactly similar to those contained in the pollen-grains of flowering plants;" and the author is of opinion that they are of the same nature as the smaller granules on the integument and in the spaces between the cells of the theca; he also finds that the larger granules are soluble in boiling water though not in alcohol; water does not dissolve the smaller ones, and alcohol produces no other effect on them than to suspend their motion. Iodine imparts to the larger granules a bluish colour, but produces little or no effect on the small ones.

Both kinds of granules have been found by the author in the unripe thecæ of ferns, of Lycopodium and of Ophioglossum; he has also observed active granules in the unripe thecæ of mosses and several species of Jungermannia, in the apothecia of lichens, in the lamellæ of Agarics and the perithecia of some other Fungi.

> "On comparing these granules with those contained in the unopened anthers of flowering plants, they appear to me to be in every respect identical; in both cases, where the larger ones occur, they are similarly acted upon by iodine, and are therefore probably of the same nature; in the theca they appear to occupy a similar place with those in the cells of the anthers, and they decrease in like manner during the progress to maturity of the pollen-grain and of the spore. In the granular contents of the spore also there is the most perfect resemblance to those of the pollen-grain. Perhaps the most obvious difference is in the entire absence of green colour from the fluid of the latter."—p. 571.

The paper concludes with a detail of the changes which take place in the organization of the theca during the progress of the spores to maturity; and the descriptions are illustrated by figures.

Art. XLIII.—*Account of two new Genera allied to* Olacineæ. By George Bentham, Esq., F.L.S.

The two species on which Mr. Bentham has founded one new genus, Pogopetalum, are among the plants collected by M. Schomburgk in British Guiana: and fine specimens of another genus, named Apodytes dimidiata by Ernst Meyer in Drége's plants, but first described in the present paper, are in a collection from Port Natal, in South

Africa, communicated to the author by Mr. Harvey. The determination of these genera having led the author into an inquiry as to the affinities of others belonging to the same group, the results of his inquiries are given in the paper here published.

Great difference of opinion seems to have been entertained among botanists, respecting the true position and affinities of the Olacineæ: after giving a synoptical view of the whole order, in which the eleven genera belonging to it are briefly characterized and divided into three tribes, the author comes to the conclusion that Mr. Brown's view of the close connexion of this order with the Santalaceæ is the correct one. The paper concludes with detailed descriptions of the two new genera, which are also figured.

Art. XLIV.—*Extracts from the Minute-Book of the Linnean Society of London.*

1837. *Nov.* 21. Read the following "Notice of the discovery of *Cucubalus baccifer*, Linn., in the Isle of Dogs." By Mr. George Luxford, A.L.S.

"The accompanying specimen of Cucubalus baccifer was, with many others, collected by me in the Isle of Dogs, in the early part of last August. This plant was originally introduced into the British Flora by Dillenius, in the third edition of Ray's Synopsis, [267, under the name of Cucubalus Plinii]. He there speaks of it as having been gathered in hedges in Anglesea (Mona) by Mr. Foulkes of Llanbeder, and sent by him to Dr. Richardson; but in a letter from Mr. Foulkes to the latter gentleman, published in the Linnean Correspondence, vol. ii. p. 171, he states that he only had 'an account of it from one who pretended to know plants very well,' but that he himself 'could find no such plant.' In a note to this letter, in the work just mentioned, Sir J. E. Smith says, 'Nobody, as far as I could learn, has ever met with the plant since, except in curious botanic gardens, in any part of the British isles; and accordingly I was obliged to be content with a garden specimen for the figure in 'English Botany,' tab. 1577. I am, therefore, under the necessity, however unwillingly, of excluding the Cucubalus baccifer from our British Flora.' It was accordingly omitted when Sir James published his 'English Flora.'

"The locality in the Isle of Dogs is on the banks of the ditch on the left hand of the road from Blackwall to the Ferry-House; and there, if not truly indigenous, it is at least perfectly naturalized. I also feel convinced that I have met with it in similar situations in other parts of England; but the plant not being in flower, I have passed it, as I did the first time I saw it in the Isle of Dogs, thinking it to be merely Cerastium aquaticum, which in that state it much resembles. It is probable that, like Polygonum dumetorum, this plant only requires to have the attention of botanists directed to it, to lead to its discovery in other localities; and I shall be happy if my meeting with it so near London may be the means of getting it restored to the British Flora, where it is certainly as much entitled to a place as Centranthus ruber, Petroselinum sativum, and other avowedly naturalized plants."—p. 687.

1838. *June* 19. Read a description of Cattleya superba, *Schomburgk;* the description and figure have since been published in Lindley's 'Sertum Orchidaceum,' t. 22.

December 18. Read a "Notice of Cereus tetragonus." By Edward Rudge, Esq., F.L.S. The plant is a single stem between nine and ten feet high. For about a foot from the roots it is four-angled; at between three and four feet it is five-angled, with the angles lobed, and within about eighteen inches of the top it has six angles. The flowers are produced from the angles, and near the top of the stem.

1839. *December* 3. Read "Descriptions of some Vegetable Monstrosities." By the Rev. W. Hincks, F.L.S. The case first described occurred in a flower of Iris versicolor, which had "5 outer reflexed segments, 4 inner upright segments, 5 stamens, 5 distinct stigmas and a 5-celled ovarium. This variation appears to have been the result of the union of two flowers; and the author has witnessed a similar case in some Œnotheræ. The second case occurred in Iris sambucina, in which "3 segments of the inner series only remain, while there are 5 parts in all the other circles: the line of junction is much less evident than in the former, but may be observed in the ovarium and tube of the perianthium."

After mentioning similar cases of union of parts in other plants, Mr. Hincks observes: —

"But the most remarkable instance of this kind of union with which he has met, occurs in a specimen of Scrophularia nodosa, found at Water Fulford, near York, in which four flowers are united into one. In this case several monstrous flowers occur on the same branch, but are generally unions of only two flowers, and the terminal flowers are invariably of the ordinary structure. This Mr. Hincks regards as what might be expected in a plant with centrifugal inflorescence, where the monstrosity consists of a union of flowers; whereas in the same kind of inflorescence, when the monstrosity consists in a more full and equal development, the central flower might be expected to be the first affected; and this actually occurs in a specimen which he possesses, of a species of Linaria with all the terminal flowers (and those alone) *peloriated.*

"In the stalk of the flower of Scrophularia nodosa referred to, Mr. Hincks thinks he can recognize the junction of 4 peduncles; the number of sepals is 15, one of them being narrow and somewhat displaced; that of the petals, which all cohere together, 16. Of these 7 are the lower or more developed petals, which are upright in the limb and are united in pairs. * * Of the upper or reflexed petals only 9 remain; and as there are 3 of these in each ordinary flower, if one be supposed to have perished at each juncture, according to the analogy of the Irides and Œnotheræ, the whole number will be accounted for. The number of stamens is 20, or 5 to each flower; one of these has its anther abortive and changed into a scale, and there are several instances of two being united together, but all may be distinctly traced. There are 3 distinct ovaria," [two of which are each 2-celled, the third is 8-celled].—p. 692.

Art. LXXII. — *List of Jungermanniæ &c. observed in the neighbourhood of Dumfries.* By James Cruickshank, Esq.

The neighbourhood of Dumfries appears particularly favourable to the growth of Cryptogamic plants, especially mosses and Hepaticæ, as may at once be seen both from the number of species and the size and beauty of the specimens.

The extensive tracts of uncultivated mossy ground on the Dumfries side of the Nith, and the long range of green pasture hills on the opposite side of the river in Kirkcudbrightshire, intersected as they are by deep rocky glens, and in some parts covered with extensive woods, are all favourable to the growth of these orders.

I have for the last two years paid particular attention to the mosses and Hepaticæ, and have succeeded in collecting a good number of species of each. I subjoin a list of the Hepaticæ, with their localities, and, so far as I can judge from my opportunities for observation, the frequency of their occurrence throughout the district.

Riccia, *Linn.*

R. *crystallina*, Linn. Moist shaded ground, not uncommon: abundant in the orchard at Brownhall, near Dumfries.

Anthoceros, *Linn.*

A. *punctatus*, Linn. Sides of ditches and moist ground, not uncommon: abundant on the back of the embankment below the New Quay.

Marchantia, *Mich.*

M. *polymorpha*, Linn. Shaded banks and moist ground not uncommon.

M. *conica*, Linn. Shaded bank near the old College: by the side of a stream in Dalskairth woods.

Jungermannia, *Linn.*

J. *asplenioides*, Linn. Moist woods, damp rocks &c., common. Rare in fruit, though I have found it in that state in several localities, particularly at Dalskairth, in Kirkcudbrightshire.

J. *spinulosa*, Dicks. Dry rocks at the Craigs, near Dumfries. Near Moffat with perianths; not common.

J. *pumila*, With. On rocks and stones in a stream in Dalskairth woods; rare.

J. *cordifolia*, Hook. Criffel, Kirkcudbrightshire; rare.

J. *Sphagni*, Dicks. Terregles and Criffel, Kirkcudbrightshire: abundant in Lochar-moss, Dumfriesshire; always barren.

J. *crenulata*, Sm. Near Glen-mills and Goldilee, Kirkcudbrightshire; rare.

J. *hyalina*, Lyell. Ruttin-bridge, Kirkcudbrightshire: near Closburn, and in great abundance by the side of the stream a little above Moffat-well, Dumfriesshire.

J. *emarginata*, Ehrh. Banks of the Nith, near Friar's Carse: abundant among the Kirkcudbrightshire and Moffat hills.

J. *inflata*, Huds. Plentiful in Lochar-moss; always barren, though the perianths are abundant.

J. *excisa*, Dicks. Abundant in various parts of Lochar-moss, Dumfriesshire: by the side of the Glasgow road, a little beyond Maxwilton, in a small Marsh.

J. *ventricosa*, Dicks. Kilton Coves, Dumfriesshire, in fruit; various parts of Lochar-moss, barren.

J. *bicuspidata*, Linn. Lochar-moss, &c., common in damp places.

J. *byssacea*, Roth. Marsh a little above the Ruttin-bridge, Kirkcudbrightshire: on the top of a stone dike, opposite the farm of Akerhead, near Dumfries: and in various parts of Lochar-moss.

J. *connivens*, Dicks. Wet rocks above the Ruttin-bridge, Kirkcudbrightshire: Creechhope Linn, Dumfriesshire. It bears fruit abundantly in May.

J. *incisa*, Schrad. Summit of Criffel: abundant in various parts of Lochar-moss; rare in fruit.

J. *pusilla*, Linn. Moist fields, ditch-banks, &c., common.

J. *nemorosa*, Linn. Friar's Carse, Lochar-moss, &c.: very abundant on various parts of Criffel. Var. β. *purpurascens*, wet rocks near the summit of Criffel.

J. *undulata*, Linn. Small stream above Ingleston, Kirkcudbrightshire, growing among Hypnum cordifolium.

J. *resupinata*, Linn. By the side of the English road, Lochar-moss.

J. *albicans*, Linn. Lochar-moss: the Craigs: Glen Mills: Criffel: Dalskairth: and various other places in Kirkcudbrightshire, rather common.

J. *complanata*, Linn. Trunks of trees, roots of hedges and rocks, common.

J. *anomala*, Hook. Lochar-moss, near the side of the Lochmaben road, in considerable abundance; always barren.

J. *scalaris*, Schrad. Road-side near the Craigs: various parts of Lochar-moss, &c. not uncommon.

J. *polyanthos*, Linn. Abundant in a ditch at Terregles: small stream between Criffel and Knockindock.

J. *viticulosa*, Linn. Lochar-moss, by the side of the English road; barren.

J. *Trichomanis*, Dicks. Dalskairth woods, in fruit: various parts of Lochar-moss &c. not uncommon.

J. *bidentata*, Linn. Woods, hedge-banks and moist ground; the most common species we have.

J. *heterophylla*, Schrad. On decaying stumps of trees in the belt of wood at the Powder-Magazine.

J. *Francisci*, Hook. Road-side between Rosehall and Brownhall Farms, near Dumfries. I have not as yet found this rare species in fruit, but *perianths* are abundant.

J. *barbata*, Schreb. Craigs near Dumfries: various parts of the Moffat hills: not com.

J. *Lyoni*, Taylor. Dalskairth, with perianths; side of the stream near Moffat-well. The want of stipules at once distinguishes this from J. barbata. Described and figured in 'Transactions of the Botanical Society of Edinburgh,' *i.* 116, pl. 7.

J. *reptans*, Linn. Abundant above the Ruttin-bridge, growing among tufts of Dicranum glaucum: Glenmills and Dalskairth, among mosses on shaded rocks.

J. *setacea*, Web. Abundant in various parts of Lochar-moss, growing among tufts of Sphagnum: small marsh by the side of the Glasgow road, a little beyond Maxwilton: abundant on Criffel.

J. *trichophylla*, Linn. Rocks above the Ruttin-bridge: side of a stream in Dalskairth woods: sides of streams among the Moffat hills: by no means common.

J. *platyphylla*, Linn. Craigs near Dumfries, &c. common on rocks and trees, near the ground: rare in fruit.

J. *lævigata*, Schrad. Abundant at the Craigs, near Dumfries; barren.

J. *tomentella*, Ehrh. Wet places in Dalskairth woods. This and the following may be considered two of the rarest, as they are certainly the most beautiful, species of the genus found in this neighbourhood.

J. *ciliaris*, Linn. On a rock above Dalskairth; rare.

J. *serpyllifolia*, Dicks. Dalskairth woods: Craigs near Dumfries: Creech-hope Linn, Dumfriesshire: and near Moffat; always barren.

J. *dilatata*, Linn. Trunks of trees, roots of hedges, rocks and stones; common.

J. *Tamarisci*, Linn. Rocks and trees, near the ground, common; rather scarce in fr.

J. *pinguis*, Linn. Damp ground near the Powder-Magazine, &c., not uncommon in bogs and watery places. Var. β. Lochar-moss.

J. *multifida*, Linn. Marshes and wet ground, pretty common.

J. *Blasia*, Hook. Field opposite Clouden-mills, Kirkcudbrightshire; rare.

J. *epiphylla*, Linn. Moist ground, ditches &c., common. Var. β. less common though by no means rare.

J. *furcata*, Linn. Trees, hedge-roots and rocks, common.

J. *Lyellii*, Hook. Lochar-moss, near the side of the English road, very rare. So very sparing, indeed, is this rare species, that the whole patch might be covered by a man's hat; and though I have made the most careful and anxious search in the same neighbourhood, I could only find this single patch.

JAS. CRUICKSHANK.

Dumfries, April 18, 1842.

ART. LXXIII.—*Notes on the Genus Utricularia.*

By the Rev. J. B. BRICHAN.

THE second species of this genus — Utricularia intermedia — has long had assigned to it, as one of its habitats, the Loch of Spynie in Morayshire. Having never examined that locality I cannot positively affirm that the species is not to be found there; but I think that the following remarks, if they do not prove the contrary, at least render it very doubtful whether it has ever been gathered in Morayshire.

About ten years ago I received from a botanical friend a single specimen of an Utricularia labelled *intermedia*, and taken from the locality in question. Without particularly comparing it with the description, and not doubting the authority by which it was named, I added it to my collection. Not long after I had the pleasure of finding in the Moss of Inshoch, Nairnshire, a plant flowering abundantly, which on examination I found to be indubitably Utricularia minor; it then struck me that the plant I had found and examined was the same as that which had been sent me from the Loch of Spynie, and on comparing them they appeared identical. Not over confident, however, in my own botanical discrimination, I communicated my opinion to my disinterested friend Mr. Stables, who sent some of my Nairnshire specimens to Sir W. J. Hooker. That distinguished botanist pronounced them to be specimens of U. minor, and this, of course, I received as a final confirmation of my own opinion.

It may not at once appear from what I have written, that Utricularia intermedia has not been found in the Loch of Spynie. From circumstances, however, which have come under my cognizance, I have not the least doubt that all the specimens gathered there as U. intermedia have belonged to the other species — Utricularia minor. To confirm what I say, let me present the reader with the following extract from a 'Collectanea for a Flora of Moray,' published in 1839.— "U. intermedia. Observed to flower annually since 1830, in some holes whence turf seems to have been cut, under the north bank of the Loch of Spynie, about half a mile west from Ardivol. *If there be a specific difference between this and U. minor, the Spynie plant upon closer inspection will probably be found to belong to the latter species.*"

I request the reader's attention to that part of the extract which I have marked for Italics; it implies a doubt concerning the existence of any specific distinction between U. intermedia and U. minor. This at once convinces me that the writer of it had never gathered U. intermedia, and that the specimens in his possession were specimens of U. minor. The former I have never seen, except as figured in Sir J. E. Smith's 'English Botany;' but presuming from the correctness with which U. vulgaris and minor are there given, that U. intermedia also is correctly figured, I have not a doubt as to the truly specific distinctness of all three; and I think that U. intermedia would more readily be confounded with vulgaris than with minor. It seems rather surprising that the Spynie plant should ever have been mistaken, as it appears to have been.

Perhaps the following description of the three species of Utricularia, from 'The Northern Flora,' may be acceptable to the reader.

1. *Utricularia vulgaris.*

"Plant floating, of considerable size, sometimes fully a foot long. Leaves green, composed of numerous capillary or bristle-like segments, fringed at the margin, and carrying small, beautiful, reticulated bladders. Flowers yellow, placed upon a leafless stem, which elevates them several inches above the water: lower lip longer than the upper, and having a projecting palate, which is about the same length as the upper lip. Spur conical."

2. *Utricularia intermedia.*

"Leaves with a similarity to those of the former, usually dividing into three parts, each of which splits into two flat acute segments, fringed with bristle-like teeth. Bladders placed upon separate stalks. Flowers yellowish: the upper lip twice as long as the palate. Spur conical."

3. *Utricularia minor.*

"Leaves smooth at the edges and bearing bladders. Flowers few and small, pale yellow, with a very short blunt keeled spur: upper lip about the length of the palate."

The author of 'The Northern Flora' further observes, that "independently of the flowers it will be possible to determine the plants, as follows. The *first* species may be always recognized by the large size, and by the leaves being minutely fringed and supporting the little bladders. In the *second* the bladders are not mixed with the leaves, but placed upon distinct stalks, and the plant is more leafy, with the segments broader, and, so far as I have observed, of a paler green. The *last* species is known by its small size and smooth leaves, which support the bladder-like bodies."

I may add, that as far as my experience goes, U. vulgaris flowers in *deep* water, while U. minor flowers only in *shallow*.

J. B. BRICHAN.

Manse of Banchory,
June 11, 1842.

ART. LXXIV. — *Varieties.*

171. *List of some of the rarer Plants observed in the neighbourhood of Birmingham.*

Veronica montana and *Anagallis*. Sutton Park.
Pinguicula vulgaris. Sutton Park.
Valeriana dioica. Moseley Bog.
Rhynchospora alba. Ditto.
Scirpus cæspitosus. Sutton and Coleshill.
Eleocharis acicularis. Sutton.
Eriophorum vaginatum. Ditto.
Alopecurus fulvus. Edgbaston Park.
Agrostis Spica-venti. Canal-side near Strawberry-vale.
Aira præcox. Moseley Common & Sutton.
—— *caryophyllea*. Common about Edgbaston.
Danthonia decumbens. Moseley & Sutton.
Festuca loliacea. Pershore road and other places in the neighbourhood.
Montia fontana. Sutton and Moseley.
Dipsacus pilosus. Several places in the neighbourhood.
Alchemilla vulgaris. Fields on both sides the Pershore road.
Sanguisorba officinalis. Common.
Radiola Millegrana. Coleshill Pool.
Echium vulgare. Dudley Castle.
Anchusa sempervirens. In the hedge of a field in Strawberry-vale.
Myosotis cæspitosa. Moseley.

Anagallis tenella. Moseley, Sutton, and Coleshill.
Menyanthes trifoliata. Ditto.
Villarsia nymphæoides. Packington Park, abundantly.
Atropa Belladonna. Dudley Castle.
Verbascum nigrum. Lane connecting the two Walsall roads at Perry Barr.
Jasione montana. Plentiful near Sutton.
Campanula patula. On the Coventry road 5½ miles from Birmingham.
——— *latifolia*. Yardley Bridge.
——— *Trachelium*. Perry Barr.
Rhamnus catharticus. Yardley Bridge.
——— *Frangula*. Coleshill Pool.
Viola palustris. Common in boggy places.
Ribes alpinum. Side of Edgbaston Pond.
—— *nigrum*. Yardley Bridge.
Helosciadium inundatum. Coleshill Pool.
Œnanthe fistulosa. Yardley.
Chenopodium polyspermum. Bristol Road.
Ulmus carpinifolia. Edgbaston.
Parnassia palustris. Sutton and Moseley.
Linum usitatissimum. Castle-Bromwich road.
Drosera rotundifolia. Sutton and Moseley.
Myosurus minimus. Found in 1839, 40, and 41, at Mr. Dickinson's nursery, Bristol Road; but never more than two specimens in one season.
Peplis Portula. Sutton.
Narcissus Pseudo-narcissus. Abundant at Yardley.
Narthecium ossifragum. Moseley & Coleshill.
Luzula campestris, var. *β. congesta*. Moseley Common.
Rumex palustris. Sutton.
Triglochin palustre. Sutton and Moseley.
Erica Tetralix, var. *alba*. Ditto.
Vaccinium Myrtillus & *Vitis-Idæa*. Sutton
——— *Oxycoccos*. Moseley.
Epilobium roseum. Bristol-Road nursery in 1839, but I have not seen it there since.
——— *palustre*. Moseley.
Polygonum Bistorta. Perry Barr.
Sedum reflexum. On houses by the roadside at Solihull.
Spergula nodosa. Sutton.
Rubus Idæus. Very common.
Potentilla Comarum. Moseley and Sutton.
Nymphæa alba. Sutton.
Ranunculus Lingua. Ditto.
Galeopsis versicolor. Perry Barr, &c.
Scutellaria minor. Moseley.
Pedicularis palustris. Ditto & Coleshill.
Linaria Cymbalaria. Dudley Castle.
Thlaspi arvense. Field by roadside leading from Mereden to Stonebridge.
Cardamine amara. Edgbaston Pond, abundant.
Turritis glabra. Lane leading from the Castle-Bromwich Road to Yardley.
Nasturtium sylvestre. Sutton.
——— *amphibium*. Common in watery places.
Geranium pyrenaicum. Harbourn.
Corydalis claviculata. Hedge by roadside, Strawberry Vale.
Genista anglica. Sutton.
Hypericum maculatum. Canal-side near Strawberry Vale, and at Packington.
——— *pulchrum*. Moseley.
——— *elodes*. Sutton and Coleshill.
Carduus eriophorus. Dudley Castle.
——— *pratensis*. Moseley and Coleshill.
Bidens cernua and *tripartita*. Worcester Canal and elsewhere.
Chrysanthemum segetum. Packington.
Achillæa Ptarmica. Very common.
Typha angustifolia. Sutton.
Carex vesicaria and *ampullacea*. Edgbaston Pond and Moseley.
Littorella lacustris. Coleshill.
Myriophyllum spicatum. Sutton.
Salix pentandra. Edgbaston Pond.
Empetrum nigrum. Sutton.
Lastræa Oreopteris, *Lomaria Spicant* and *Osmunda regalis*. Moseley Common.
Lycopodium clavatum. Sutton.

The above list is no doubt very imperfect, but it includes all, except the commoner plants, that I have had an opportunity of observing.—*Samuel Freeman*; 11, *Sun St. West*, *Birmingham*, *October*, 1841.

172. *Note on Phascum alternifolium.* I enclose a specimen of the Phascum alternifolium of Bruch and Schimper's 'Bryologia Europæa.' It is a very different plant from the Phascum alternifolium of British botanists, which is the Archidium phascoides of continental authors.—*Jas. Cruickshank; Crichton Institution, Dumfries, Apr.* 18, 1842.

[The specimens are in fine condition, and are labelled — "Near Dumfries, April, 1842. I discovered it in March, 1840. *It is very rare.*"—*Ed.*]

173. *Arenaria verna.* I likewise enclose a specimen of Arenaria verna, from Colveind, Kirkcudbrightshire, where it was discovered by Mr. John Brown, Dumfries, in 1838, thus proving that it is found on the west coast of Scotland, where Sir W. J. Hooker says it does not occur.—*Id.*

174. *Economical use of the Brake* (*Pteris aquilina*, Linn.) *in the Forest of Dean.* Passing a few days a fortnight since at a friend's house in the Forest of Dean, Gloucestershire, I was surprized by some girls bringing a quantity of recently cut Pteris aquilina, or "*Farn*," which they retailed about at twopence per bushel. On enquiring the use to which it was put, I was informed that it was extensively employed in the forest for feeding pigs, which are very fond of it. For this purpose, however, it must be cut while the fronds are still uncurled, and a quantity of them boiled in a furnace. The *slushy* or mucilaginous mass thus produced is then consigned to the wash-tub, or any other receptacle, and in this state it will keep as pig-food for a considerable length of time. I was informed that it was found very serviceable, especially to cottagers, as coming in at an early period of the summer, when the produce of the garden is but scanty. Perhaps a boiled dish of the Pteris in its circinate state, might not be very unpalateable or unacceptable with a broiled rasher of bacon — at least to a hungry man. If so, we might thus have a variation in our spring vegetable condiments; but I am not aware whether the experiment has been made.—*Edwin Lees; South Cottage, Malvern Wells, June* 4, 1842.

175. *Enquiry respecting Carex axillaris and remota.* Allow me, through the medium of 'The Phytologist,' to enquire if any of the readers of that work can tell me how to distinguish Carex axillaris from Carex remota. I have spent much time in trying to make out the difference, and all to no purpose. Carex axillaris is said to be a very rare plant; this may account for my not being able to make it out. Dr. Goodenough tells us in the second volume of the Linnean Transactions, that the capsules in C. remota are entire, and in C. axillaris cloven; if I rely on that character C. remota *I have never seen.* But on turning to the third volume of that work, I find Dr. Goodenough withdrawing the statement, and telling us that he believes that all Carices dispose of their seeds by the opening of the points of their capsules. It would appear by this that Dr. Goodenough was not a very close observer of the Carices, or he would have known that they, at least our British species, do not dispose of their seeds in other way than by their capsules (if so I may call them) and seeds falling together. Smith seems to rely very much on the spikes being simple or compound; he tells us that the spikes of C. remota are simple, and those of C. axillaris compound: if this be the character to distinguish them by, I have often seen both species on the same root. He also says that the lower bracteas of C. axillaris are very long, and that the beak of the fruit is more deeply cloven than that of C. remota, though he says the difference is not very striking, It appears that Sir W. J. Hooker relies very much on the length of the lower bracteas in distinguishing the two species; directly opposite to what Smith has said, he tells us that the lower ones in C. axillaris are scarcely so long as the spike. He also tells us that C. axillaris is a stouter and taller plant than C.

remota, the latter character needs no comment; suffice it to say that I have now before me good specimens with roots, varying in height from three inches to three feet; and as to the bracteas, a little attention to the Carices will serve to show that the length of these parts is not at all to be depended upon. I see there is something said in the 'British Flora' on the scales of the calyx of the two species; these I will now examine and give you the result. The three *scales* I now enclose are from *the same spike;* they *all* have *two close green nerves;* in one you will observe that the nerves are discontinued below the point, in the others they are extended to the point: you will also observe that one is only about one half the proportionate breadth of the others. As the scales of most of our Carices are much broader about the middle or in the lower part of their spikes than at or near the summit, we may rely too much on such characters. Now, after gaining what information I possibly can from books, I turn to my specimens, and on examining them, among the rest I find two fine specimens of C. divulsa, sent to me a few years ago (from what was then considered good authority) for C. axillaris; another I find, of recent date (from what is now considered good authority), that was sent for C. axillaris, which turns out to be C. paniculata; so that I gain no information by this, and as a last resource I avail myself of 'The Phytologist.' Perhaps some of the readers of that work will be able and kind enough (if there be no secret in the matter), to inform me how to distinguish the two species. In addition to the above enquiry, I beg to say that good specimens or information on *any* of the Carices is always most gratefully received by me; as it is my intention, at some time or other, to give a paper at some length on the British species and varieties of this genus, when I shall have to notice some strange forms, and one in particular, which is now considered to be a new species, and will be called *Carex Leylandi.* The plant was discovered by me about a mile from Hebden Bridge in May 1840. It has been seen by Mr. Leighton and many others of our eminent botanists, and they all consider it quite new; and Mr. Babington, in his letters also expresses his opinion that it is distinct. —*Samuel Gibson; Hebden Bridge, June* 8, 1842.

176. *Enquiry respecting Bromus commutatus.* While on the subject of enquiries, allow me to ask what are the "more technical distinctions" of Bromus commutatus? (Phytol. 136). The writer of the notice referred to appears to doubt whether Bromus arvensis be a British plant; a few days ago I had the pleasure of giving to Mr. Borrer specimens of the true B. arvensis. I first found the plant in 1840, growing about half a mile from Hebden Bridge; and in 1841 I again found it in abundance in this neighbourhood. The three spikelets I enclose will serve to show that no reliance can be placed on the size of the flowers: the three are from the same plant.—*Id.*

177. *Stellaria holostea with laciniated petals.* In my rambles about this neighbourhood I have met with a singular laciniated variety of Stitchwort (Stellaria holostea?). The petals have at the base of the incisure a very minute tooth, slender and sharp-pointed, about half a line in length; the tip of each segment of the petals is also divided into two unequal acute teeth, the outermost being about half the size of the inner one. The leaves on the stems are the shape and size of those of S. holostea, and have also the peculiarly fine serrature of the edges. The flowers are about one third smaller than the regular size of those of S. holostea. The plants formed several large bushes in the hedge on one side of the road near the summit of one of our mountains, they occupied a portion of the hedge about a dozen yards in length, forming four or five rather large bushes at each end of the above distance. Bushes of plants with flowers of the regular form were closely adjoining them, the branches in one case in-

tertwining. The laciniation of the petals gave the bushes of the plant a singular appearance, that attracted the attention when at some distance. I intend to try to procure some of the seeds when mature, and sow them against next season, in order to observe whether the dentation of the petals will be trasmitted by seeds or not.—*James Bladon; Pont-y-Pool, June* 13, 1842.

178. *Lavatera Olbia in Epping Forest.* A few years since a new piece of road was made through Epping Forest to Woodford. At a spot called Fair-mead Bottom a large quantity of earth was dug from the forest and thrown up to raise the road, for the distance of about half a mile. The following summer the sides of this piece of road were covered with various plants, such as Senecio Jacobæa, thistles, &c., and among them a great number of plants of Lavatera Olbia, a species not known, I believe, as a native of Britain. There is not the slightest doubt that the seeds had been buried for a vast number of years, and vegetated when brought to the surface, as it seems impossible for the plants to have got there in any other way. For three or four years they seemed to flourish, and flowered abundantly; but now the banks having become covered with grass &c., they seem to be disappearing, and last year I could find only three or four plants: when I first noticed it there were hundreds scattered along the whole length of the raised portion of the road.—*Henry Doubleday; Epping, June* 14, 1842.

ART. LXXV.—*Proceedings of Societies.*

LINNEAN SOCIETY.

Anniversary, May 24, 1842.—The Bishop of Norwich in the chair. The bye-laws relating to the election of officers having been read, the ballot was commenced and the following were declared duly elected.

President. — Edward, Lord Bishop of Norwich.

Edward Forster, Esq., *Treasurer.* J. J. Bennett, Esq., *Secretary.* Richard Taylor, Esq., *Under Secretary.* New members of Council: — Lord Beverley, J. A. Hankey, Esq., John Miers, Esq., R. I. Murchison, Esq., and Alfred White, Esq., in the place of A. B. Lambert, Esq., G. Mantell, Esq., LL.D., The Marquis of Northampton, R. H. Solly, Esq., and W. Yarrell, Esq. It appeared from the Treasurer's accounts that the receipts during the past year had amounted to £785. 10*s.* 10*d.*, the expenditure to £761. 17*s.* 5*d.*, leaving a balance of £23. 13*s.* 5*d.* in the Treasurer's hands.

The following Statement was read. — "The Council, having had under their serious consideration the financial affairs of the Society, submit the following statement to the Fellows at large. The cost of the Collections and Library of Linnæus, together with those of the first President, Sir James Edward Smith, purchased of the executors of the latter in 1828, amounted to £3000. Of this sum about £1500 were then raised by subscription; and to meet the remainder a debt, on bonds, was incurred, which now amounts to £1300, paying interest at 5 per cent. In consequence partly of this amount of interest, and partly of a diminution in the annual receipts, there has been accumulated, within the last few years, a further debt of about £500. By recent arrangements a saving of some amount has been effected in the expenditure; but the Council are convinced that no farther material reduction can be made, without greatly impairing the efficiency of the Society, and they desire to avoid, as far as possible, the necessity of calling upon the Fellows to agree to a small charge being placed upon the Society's publications, that appearing to be the most obvious means of supplying the deficiency in the annual receipts. With this view they propose a general subscription, which they trust may reach such an amount as to meet the present liabilities, and to relieve the funds of the Society from the burthen of debt and interest. They, therefore, earnestly recommend the subscription to the members of the Society." The names of subscribers to the amount of £600 were appended to this statement, which was circulated among the members present at the meeting.

The following members have died during the past year:—J. Ansley, Sir W. Beatty, Sir Charles Bell, Rev. I. Bell, J. E. Bowman, Rev. T. Butt, W. Cattley, Dr. E. J. Clarke, Geo. Coles, R. Goolden, W. Harrison, Robert Higgin, Philip Hurd, Dr. J. R. Johnson, A. B. Lambert, C. Lane, Richard Leigh, Robt. Maughan, Archibald Menzies, and David Pennant; Fellows. Of Foreign Members, Auguste Pyrame De Candolle and Janus Wilken Hornemann. Of Associates, the Rev. R. F. Bree, Professor Don, and Mr. C. E. Sowerby.

BOTANICAL SOCIETY OF EDINBURGH.

June 9, 1842.—Dr. Neill in the chair. Donations to the library and herbarium were announced from the Worcestershire Natural-History Society, Dr. Miguel, M. Parlatore and Mr. Sowerby.

Professor Graham communicated the agreeable intelligence, that the late Mr. Archibald Menzies had bequeathed to the Botanic Garden his interesting and valuable herbarium, which was chiefly formed in the course of his voyages round the world with Vancouver and other circumnavigators. Mr. Menzies was the last survivor of Vancouver's companions, having lived to the age of eighty-eight. He was a native of Perthshire, and studied at this University, towards which he continued throughout life to entertain the warmest feelings of attachment.

The chairman adverted, with deep regret, to the loss which the Society, in common with the botanical world, had sustained by the death of Mr. Falconar of Carlowrie, who was a most zealous and successful cultivator of the science, and who enjoyed, in a high degree, the esteem and respect of his friends.

The following papers were read:—

1. *Notice of the discovery of Phascum alternifolium* (Bruch &c.) *in Dumfriesshire, and of Arenaria verna, on the west coast of Scotland:* communicated by Mr. James Cruickshank. This *Phascum* is not the plant of Hooker, which is the *Archidium phascoides* of continental botanists. The present plant was formerly discovered in Britain, but long ago and in very small quantity. It is, in the opinion of Mr. Wilson, a good species. *Arenaria verna* was found at Drumlanrig, by Mr. Cruickshank. It is very rare, if existing at all, on the west coast of Scotland.*

2. *Notice on the occurrence of Avena alpina and Saxifraga umbrosa in Yorkshire:* by Mr. J. Tatham, jun.† Mr. Tatham says,—"*Avena alpina* grows here (Settle) at an

---

* There is a discrepancy between the Report and Mr. Cruickshank's note, Phytol. 263.

† See also a note by Mr. Simpson, Phytol. 75.

elevation of between 600 and 800 feet above the sea. When growing in our elevated open pastures the plants are generally single, also on our limestone cliffs; but when in our natural woods, which are mostly hazle, it is found in large tufts, where you may get perhaps fifty specimens in the space of a few inches. I believe I could send from the same tuft specimens of *alpina* with the panicle quite as simple as any *pratensis*. I consider *Saxifraga umbrosa* as really wild here. It is met with in Heseltine Gill, which is a deep ravine at the foot of Pen-y-ghent, and Fountains Fell. There are only two houses in about three miles, and these not near the place. *Actæa spicata*, *Ribes petræum*, &c., grow along with it. The valley runs from west to east, and the *Saxifraga* is found only on the south side, which receives no sunshine except in summer. Some of the plants are inaccessible, the cliffs are so steep."

The impression of the meeting was that no specific distinction existed between the plant now shown as *Avena alpina* and *A. pratensis*, and the same remark may be applied to all other specimens of the former hitherto exhibited from British stations.

3. *On three new Species of Grasses of the Genus Poa:* by Richard Parnell, M.D., F.R.S.E. The author stated that these grasses were so unlike, in general appearance, to any of the other *Poæ*, and possessed such strong marks of specific distinction, that he considered them entitled to rank as distinct species. 1. *Poa sectipalea*, Parnell.—This plant differs from *Poa pratensis*, the only species it can well be confounded with, in the branches of the panicle being stouter, more erect and rigid; the spikelets larger. Outer palea seven or nine ribbed, seven of the ribs being very distinctly marked; inner palea one-third shorter than the outer, and invariably divided to the very base: whereas in *Poa pratensis* the inner [? outer] palea has never more nor less than five ribs, and the inner very little shorter than the outer, and always entire. Found growing in sandy situations between Cramond and Queensferry. 2. *Poa polynoda*, Parnell. This species differs from *Poa compressa*, in the florets not being ribbed at the base; outer palea five-ribbed. Joints eight or ten in number, the uppermost joint situated but a short distance from the panicle; whereas in *Poa compressa* the florets are very distinctly ribbed, suspending the carix [?] by their silky fibres. Outer palea three-ribbed. Joints seldom exceeding four in number. 3. *Poa nemoralis*, *montana* of Koch. Inflorescence simple, panicled, occasionally racemed. Panicle erect, narrow and slender; the branches erect, long and slender, bearing few spikelets. Spikelets lanceolate-ovate, of two or three awnless florets. Calyx of two unequal, acute glumes, three-ribbed. Florets not in the slightest degree webbed. Outer palea five-ribbed, the dorsal and marginal ribs slightly hairy. The whole plant is of a glaucous hue. This grass was first obtained by Dr. Greville, who, in the year 1833, gathered several specimens on Ben Lawers; since then it has been found in many parts of the Highlands, but has hitherto been considered as a glaucous variety of *P. nemoralis*.

These grasses are figured in Dr. Parnell's work on the Scottish grasses, now in the press, in which he has given 130 figures, with minute descriptions.

Dr. Graham exhibited some beautiful exotics from the greenhouses, chiefly natives of Asia—and also a specimen of the interesting *Megaclinum falcatum* in flower, which had been raised by Mr. Gray, of Greenock. A handsome plant of *Armeria fasciculata* from the south of Europe, which had been raised in the Horticultural Garden, was likewise exhibited. — *The Edinburgh Evening Post and Scottish Standard, Saturday, June* 18, 1842.

BOTANICAL SOCIETY OF LONDON.

May 20, 1842.—J. E. Gray, Esq. F.R.S., &c., President, in the chair. The following donations were announced. A specimen of sugar-cane from Madeira, presented by Mr. James Halley: a specimen of *Bupleurum tenuissimum*, found at Highgate and presented by Mr. W. Mitten (Phytol. 203): British plants from Mr. G. H. K. Thwaites, Mr. John Ellis and Mr. Edwin Lees: Books from the President. A paper was read from Edwin Lees, Esq., F.L.S., "On the Flora of the Malvern Hills. Part 3: being a Sketch of the Cryptogamic Vegetation indigenous to the chain."

Notwithstanding the limited extent of this narrow chain of hills, scarcely exceeding nine miles in length, and rising to only 1500 feet in altitude, yet they offer almost every variety of aspect and condition favourable to the development of Cryptogamic vegetation. In fact the Malvern Hills, when considered only as a ridge, without reference to the country around them, are far more remarkable for their *Acotyledonous* than their *Vascular* productions.

Commencing with the Northern termination of the hills in Cowleigh Park, several miniature syenitic spurs here appear, abrupt and rocky yet prettily shaded with wood, amidst deep glens and shaggy defiles overtopped by lateral steeps of limestone, amidst whose gullies streamlets are ever gushing with musical intonation. From this "happy valley" a verdant park-like glacis leads the wanderer up among the exposed treeless turf, and rugged, jutting-out, lichened rocks of the End and North Hills, those of the latter being more precipitous and remarkable than those of any other hill of the chain, and boasting a great number of lapideous lichens. Between this hill and the Worcestershire Beacon, a deep and winding valley extends, watered by bubbling streamlets, and abutted by moist dripping rocks on the southern side, where several species of *Jungermannia* shelter; but it must be observed that excepting in this place, and in "The Gullet" (as it is termed) of the Holly-bush Hill, almost all the other Malvern rocks are without exception dry and bleached by the wind and sun. At the Western base of the Worcestershire Beacon occurs one of the few bogs that yet remain about the hills, *Aspidium Oreopteris* marking this and the other boggy places by the profusion in which it covers the margin of the black soil. A mile farther south, at "the Wych," the syenite and limestone are in contact, and the latter having been extensively quarried, numerous abandoned excavations occur, in many instances embowered in wood, and offering favourite habitats for many mosses unable to fruit on the sunburnt sides of the hills. These limestone rocks also offer an instructive example of the lichens more particularly affecting limestone, when compared with the loftier and more exposed syenite.

From the Worcestershire Beacon undulating green knolls, many cultivated to near the summit, stretch past the Wells for a distance of four miles to the Herefordshire Beacon, without any intervening valley; but diversified in some places by rocky dry ravines, strewed with broken fragments, and in others by plantations, or natural thickets of stunted whitethorn along their sides. Round tufts of *Ulex nanus* dot the hills in every direction. The portion of the chain just mentioned terminates rather abruptly at "the Wind's Point," where a deep valley commences, plunging down to the eastern base of the Herefordshire Beacon, and extending to the romantic wooded vicinity of Little Malvern Priory, where some thick alder-holts shroud a purling stream.

The Herefordshire Beacon, with several detached eastern buttresses, lifts up its bare, shivering and indented fortified sides in sullen grandeur, turf and mosses alone occupying its windy ramparts, except a number of scathed, old, scattered elder-trees.

Mr. L. considered that nearly one half of the plants occupying the Malvern Hills are Cryptogamic; and the following synopsis will show this to be not an unreasonable supposition, especially as the census the author had taken is not to be considered a perfect one, embracing however all the species Mr. L. had been enabled to identify after an attentive examination of five years and upwards.

ENUMERATION.	*Species.*
Ferns and Equisetaceæ,	25
Mosses,	121
Jungermanniæ,	23
Other Hepaticæ, Characeæ, &c.	15
Lichens,	223
Fungi,	305
Total,	712

Mr. Lees had been unable to give any attention to the *Algæ Confervoideæ*, and had not taken much note of the minuter species of *Sphæria* among the Fungi, so that were these carefully noted by the algologist and practised mycologist, doubtless the list might be easily extended to a thousand or more. But in an enumeration of the Flora of any locality, especially when considered with reference to a comparison with other lists, it is hardly fair to drag into the account every black spot or stain upon leaves or dead sticks; and therefore Mr. L. had left untouched nearly all but the really tangible and decided species, independent of minute microscopical examination.

Ferns.—The rarer ferns of the hills are *Polypodium Dryopteris* and *Allosorus crispus;* the latter only occurs upon the Herefordshire Beacon, thus offering a good illustration of the geographical distribution of plants, the fern thus occurring so sparingly on these hills being plentiful upon the Welch mountains. *Asplenium viride*, also another fern of common occurrence about the waterfalls of Wales, though not found on the hills themselves, occurs on an old stone bridge over the Teme called Ham Bridge, a few miles northward of Great Malvern. *Aspidium Oreopteris* occupies in profusion the margin of various boggy spots on both the eastern and western sides of the hills. *Aspidium dilatatum* is of common occurrence among the stones of the hills; and *Asplenium Filix-fœmina* almost fills the little watery glens running among them. *Polypodium vulgare*, with stunted growth and multilobed varieties, is not unfrequently met with in and on the sides of deep hollow lanes. *Grammitis Ceterach*, though scarcely truly belonging to the district, and not found on any of the rocks, yet flourishes on a massive stone wall by the side of the road at Great Malvern; and Mr. L. had also noticed this fern growing in the interstices of an old brick wall at Forthampton. On Rosebery Rock, north of Great Malvern, Mr. L. had gathered very singular specimens of *Scolopendrium vulgare*, eighteen inches in length, with the extremities of the frond lobed in a most remarkable multifid manner; the specimens are in the Society's herbarium, having been sent some time since. *Pteris aquilina* robes the bases and three parts up most of the hills of the chain, and would be a great pest were it not mowed down every autumn, and stacked in ricks for litter by the humble economical farmer. It is perhaps remarkable that Mr. L. had never yet been able to detect a single species of *Lycopodium* at any point or in any spot throughout the entire length of the chain or about its base.

Mosses.—The mosses have exercised a considerable agency in the creation of the soil now upon the Malvern Hills; doubtless indeed they were the primary originators of vegetation upon the bare rocks, whose hollows they have filled up in the lapse of ages with a soft spongy carpet, and so encompassed and obscured them that numerous masses of grey rock, almost immersed in the verdant mossy inundation, now scarcely exhibit their points above it. The lichens have been generally considered as the first pioneers of vegetation, but their efforts to create a *humus* for the nourishment of other plants are but trifling when compared with the economical powers of the mosses. To test this by experiment, observing the tiled roof of an outbuilding at Malvern Wells, evidently erected but a few years, studded with tufts of *Bryum capillare*, (Linn.), Mr. Lees gathered one of them in March last, with the black earth collected around its base. The mass altogether weighed six ounces; but when, after repeated and careful washings, Mr. L. had extracted all or nearly all the black mould that enveloped the roots, the actual residuum of frondescence when weighed amounted to only half an ounce; thus satisfactorily showing (for no soil could have been collected on the sloping roof, independently of the agency of the *Bryum*) that the moss, through atmospherical and imbral agency, had formed a soil exceeding its own weight at the very least above ten times! By operations on a more extensive scale, it is easily conceivable how a bare mass of rock may, in the course of a few years, be covered with a thick coating of soil, sufficient for the nourishment of any of the phanerogamous species adapted to the climate and elevation where they may stand. Mr. L. regretted that in the experiment adduced he could not certainly determine the exact space of time that the *Bryum* had occupied the roof; but as it is found expedient, from the excessive growth of mosses, to cleanse roofs about Malvern almost every year, Mr. L. felt certain that, at the utmost, the plants in question had been located on the tiles between two and three years. *Bryum hornum* has been noticed to be a great accumulator of soil in marshy spots; while the excessive growth alone of the stems and foliage of such mosses as *Sphagnum palustre*, *Dicranum glaucum*, *Bryum palustre*, *Hypnum molluscum*, *Hypnum cuspidatum*, &c., in the course of time entirely fills up bogs, drinks up their water, and conduces to their ultimate establishment as component parts of *terra firma* fit for useful cultivation. In this manner Mr. Lees considered the Malvern Hills to have received originally that rich *humus* which covers their sides, and which, combined with the disintegrating touch of time's mouldering fingers, renders their soil, in the present day, capable of immediate cultivation, even in the steepest places, producing crops that well repay the toil of the industrious cultivator, and tend to give an impulse to fresh inclosures of the verdant turf every year. On a first cursory glance at the turf of the hills, there seems a great sameness in the mosses that luxuriate there. *Dicranum scoparium*, *Hypnum triquetrum*, *splendens*, *purum* and *molluscum*, seeming as if they had united to exclude the rest, *Hypnum triquetrum* especially everywhere predominating. However, a little attention will show a considerable variety, especially upon or in the immediate vicinity of the rocks or on the margin of the numerous tinkling rills that show a cincture of the tenderest green wherever they trickle down. Inclusive of the woods about the bases of the hills, Mr. Lees had numbered 121 species, without by any means exhausting the interminable *Hypna*, so that it is probable a few more may yet be detected. Specimens of nearly all that Mr. L. had met with accompanied the paper, and many of them were exhibited. Here followed a list of those observed.

June 3.—J. E. Gray, Esq., F.R.S., &c., President, in the chair. Mr. J. A. Brewer exhibited living specimens of *Ophrys muscifera*, *Aceras anthropophora*, *Orchis ustulata*, *Paris quadrifolia*, *Mespilus germanica*, and other interesting plants from Reigate, Surrey. Mr. T. Twining, jun., exhibited a large collection of cultivated specimens from Twickenham. Mr. M. J. F. Sidney presented a specimen of *Lycopodium lepidophyllum* from Valparaiso. Mr. Adam Gerard presented a collection of plants from Sierra Leone. Dr. J. B. Wood presented specimens of *Carex elongata*, collected at Chorlton, near Manchester, (Phytol. 198). Donations to the library were announced from the Natural-History Society of Northumberland and Mr. M. J. F. Sidney: and British plants had been received from Mr. Sidney. Read, the continuation of Mr. Edwin Lees' paper (commenced at the last meeting),—"On the Flora of the Malvern Hills. Part 3: being a Sketch of the Cryptogamic Vegetation indigenous to the Chain."

Hepaticæ.—Among the Hepaticæ occur *Anthoceros punctatus* and *Targionia hypophylla*, the latter at the foot of the Worcestershire Beacon; and there are three species of *Marchantia*, *polymorpha*, *conica* and *hemisphærica*. The *Jungermanniæ* are not in such variety as might have been expected, though some of them, especially *Tamarisci*, *dilatata* and *ciliaris*, are abundant upon the turf of the hills as well as upon the rocks. *Jungermannia pinguis* (Linn.) is excessively common, though very rarely fruiting: *J. tomentella* is a beautiful species that has only occurred in one place, on a dripping rock in "the Gullet." The following are all the species Mr. L. had met with:—

Jungermannia asplenioides
ventricosa
bicuspidata
connivens
pusilla
resupinata
albicans
obtusifolia?

Jungermannia complanata
scalaris
viticulosa
Trichomanis
bidentata
platyphylla
ciliaris
tomentella

Jungermannia Mackaii
serpyllifolia
dilatata
Tamarisci
pinguis
epiphylla
furcata

Lichens.—The Malvern Hills are particularly remarkable for the various lichens they produce, most of which grow in a very luxuriant and beautiful manner; and in the moist autumnal and wintry months many of the rocks present an appearance from them truly gratifying to the lover of nature. Some of the harder granitic rocks are entirely covered with *Umbilicaria pustulata*, which at this time is of an olive-green colour, and as flabby as a piece of moist leather, though in the summer months it appears as black and sooty as if subjected to the action of fire. On other rocks the deep purple *Parmelia omphalodes* extends itself, contrasted with wide patches of the grey *Par. physodes*, the darker *P. saxatilis*, the dingy *P. olivacea*, or the conspicuous glaucous pitted thalli of *Sticta scrobiculata*. On the higher rocks the curled *Cetraria glauca* grows in abundance; while a remarkable hoary aspect is imparted to the protruding masses by the silvery *Toidium coralloides*, and the still more coralline appearance of *Sphærophoron compressum*. The rein-deer lichen, *Cladonia rangiferina*, called by Crabbe

"The *wiry moss* that whitens all the hill,"—

is plentiful on the turf with its allied species, and the sadder and darker *Cornicularia;* while in every part the brown and scarlet apothecia of the *Scyphophori*, in all their multiform varieties, contribute to decorate the scene. In the whole, including the cortical lichens, about 220 species are met with.

It may be specially remarked that the Parmeliaceæ and Collematæ, and the Peltigerous tribe of lichens, are particularly abundant on the Malvern Hills, as well on the moss and turf as on the rocks. Here followed a list of the lichens, most of which accompanied the paper.

Fungi.—The extensive dispersion of the majority of the Fungi causes them to be met with in most parts of the country at all favourable to fungoid development. The moist grassy declivities of the hills are, however, in autumn peculiarly adapted to the growth of the Agaric tribe; and at that season great quantities appear, and of every conceivable colour, from the vivid scarlet of *Agaricus muscarius*, or the brilliant green and yellow of *A. psittacinus*, to the dullest brown assumed by the common fairy-ring *A. oreades*. Mushrooms are generally very plentiful, though the common kind, *A. campestris*, is much exceeded in numbers and luxuriance by *A. Georgii* : *A. procerus* is also very abundant, and frequently of enormous size. *A. granulosus*, *pratensis*, *conicus* and *coccineus* commonly occur. The short turf, too, is often adorned by different coloured *Clavariæ*, intermixed with the dark *Geoglossum glabrum* and *Spathularia flavida*. The brilliant little blood-red *Peziza humosa* is very common amongst dark masses of *Polytricha ;* while in moist weather a characteristic feature is presented to view in the great number of "Jews' ears" (*Exidia Auricula-Judæ*), hanging upon the countless old elders that cover the eastern declivity of the Herefordshire Beacon.

The little beech-wood behind the Wells Hotel, harbours several rare or curious species; and here Mr. L. had gathered the following species in great abundance:—

- Agaricus hypothejus, *Fries.*
  - torminosus
  - violaceus
  - glaucopus
- Hydnum repandum
- Thelephora coralloides
- Clavaria abietina
  - rugosa
- Helvella crispa
- Peziza onotica, *Pers.*
- Phallus impudicus

In the same little wood *Bryum roseum* may always be found, and Mr. L. had gathered it in fruit there.

Many other fungoid productions may be met with: and here followed a list of those observed.

On the whole the Flora of Malvern may be considered as most remarkable and abundant rather in its Cryptogamous than Phanerogamous productions. After an attentive examination of the hills and the district around them for some years, Mr. Lees had been enabled to determine:—

Dicotyledonous Plants, ...	553
Monocotyledonous Plants, ...	173
Total Phanerogamic, ...	726

Mr. L.'s Cryptogamic census amounts altogether to 712, and with a little more industry and research among *mycological* productions, the author doubted not it might considerably exceed this amount, while few, he thought, could be added to the Phanerogamous list. The flowering plants observed by Mr. Lees are extended to the limits (given in the first paper, Phytol. 152) to the banks of the Severn, while the Cryptogamia are more exclusively the product of the hills and the woods at their bases. Altogether the entire number of plants which Mr. Lees had determined and appropriated as belonging to the Flora of the Malvern Hills, amounts to 1438.

Thanks having been voted to Mr. Lees for his interesting communication, the President announced that the Council had appointed Mr. Arthur Henfrey, Curator; and that the herbarium might be inspected every Monday, Wednesday and Friday, from 10 to 4, and on Friday evenings from 7 to 10. The President also announced that the first excursion of the members would take place on the 7th instant.—*G. E. D.*